

**REMARKS/ARGUMENTS**

Reconsideration is respectfully requested of the Official Action of November 12, 2003, relating to the above-identified application.

With entry of the foregoing amendment, the claims in the case will be Claims 1, and 3-7.

Claim 1 has been amended to conform essentially with the allowed claims in the corresponding European patent application EP 1 175 377 B1. A copy of the allowed claims in the counterpart European case is enclosed herewith for the convenience of the Examiner. The only difference between Claim 1 as presented herein and the European claim is the use of the term "vitreous" instead of the term "glass" in line 1. The basis for the term "vitreous" is found in the present application, *inter alia*, on page 3, line 3. No new matter is presented.

Regarding the rejection of Claims 1-12 under 35 U.S.C. § 103(a) and the references relied on in the Official Action; namely, *Masumi* (JP 2-172835) in view of *Osafune*, US 4,680,045, or *Osafune*, US 4,786,302, applicants respectfully submit the references do not create *prima facie* obviousness for the claimed invention for the following reasons.

The *Masumi* Japanese document (Abstract) discloses a method for forming an optical fiber perform in which a rod is positioned inside a container or mold containing silica sol. The sol is gelled and the rod and the gel are dried and then sintered. Thus, the method described offers a system to obtain the base material for optical fibers having a large clad/core diameter ratio by forming a porous glass body by a sol-gel method on the outer periphery on the glass rod at the core and then sintering the body to form a transparent glass rod. Silicon alkoxide is used

by *Masumi* to prepare a solution and the solution is then filled into a cylindrical vessel having a glass rod which forms the core disposed in the center of the vessel. Significantly, however, as admitted in the Official Action, *Masumi* does not disclose the rotation of the vessel. There is no hint or suggestion in the *Masumi* patent that any additional process steps or conditions would be important to achieve the result which *Masumi* intends to achieve.

The Official Action relies on the two patents of *Osafune* for a teaching of the rotation of a wet silica gel to make the optical fiber perform. The Official Action concludes that it would have been obvious to rotate the mold/container of *Masumi* in that the claimed rotation would be an obvious matter of optimization of a process effective parameter. The *Osafune* patent '045 discloses the method of preparing tubular silica glass by first hydrolyzing silica alkoxide with an acid and then adding ultra fine particle silica to form a sol solution. The sol solution is then placed in a cylindrical container and gelled while rotating the cylindrical container to obtain a tubular gel. The tubular gel is dried and then sintered to form the tubular silica glass; see, the Abstract on the first page of the patent. As shown in col. 6, beginning at line 28, the sol solution is placed in the container and then the container is secured between securing members and eventually rotated. The *Osafune* patent mentions that good dimensional precision is obtained because of the centrifugal force exerted on the sol solution; see, col. 6, beginning at line 35. Typical rotational speed is disclosed in col. 6, line 65, at 980 cm/sec. This is indicated as a minimum centrifugal acceleration which will vary with the particle diameter of the silica

particles, the distance between the silica particles and the diameter of the container. Several other examples are given by the patent in col. 7, beginning at line 3.

The guidelines are given to enable a person skilled in the art to select the proper rotation to obtain the results that are said to be obtained in the patent. The maximum rotation acceleration varies with the particles and the distance between the silica particles and the diameter of the container. The patentee cautions that the speed should not exceed 1000 G because cracking occurs at the time of gelation. Thus, a controlled rotation must be done in order to avoid having the silica particles in the sol settle out as a result of the effect of the centrifugal force. The settling out is taught by the patent to result in a non-uniform gel. Non-uniformity of the gel causes cracking of the gel at the time of drying or sintering and deterioration of the optical properties of the resulting glass.

The later filed patent of *Osafune* ('302) is a continuation-in-part of the application which issued to the '045 patent and indicates in the last paragraph, col. 7, that the wet gel is soft and its shape changes easily. Thus, if the rotation is stopped, the shape of the tubular wet gel will change due to the effect of gravity and the roundness of the tubular gel deteriorates before the gel is dried.

In addition, the distortion of the tubular gel results in breaks and cracks during the drawing and sintering steps. Therefore, after the rotation is stopped, the space between the container and the tubular gel is filled with high specific gravity solutions. After that, the tubular wet gel is dried in the container while being rotated around the axis of the tube.

Both of the *Osafune* patents are directed to making sol-gel process tubes for the cladding and/or preparation of jackets for optical fiber performs. The patents disclose horizontally rotating the mold around its longitudinal axis to produce tubes through centrifugal action. The patents warn that the rotation must be done properly in order to avoid the undesirable effects of the fine particle precipitation by excessive centrifugal force, consequent poor uniformity of the gel and subsequent cracking of the gel during the drying and sintering process steps. They do teach how to avoid producing cracking the gel by excessive rotation; however, they don't teach to prevent cracks by the rotation of the gel. In other words, in applicants' process, a carefully controlled rotation is provided to prevent cracking, whereas the *Osafune* patents are simply directed to reducing the rotation in order to avoid cracking. The references advise person skilled in the art to limit rotation to what is strictly necessary to produce tubes because excessive rotation would produce undesirable effects which would result in cracking. See, *Osafune* '045, col. 6, lines 35-68, and col. 7, lines 1-15, and *Osafune* '302, see col.7, lines 20-52. (Note that line 52 of *Osafune* '302 contains an error in that it should probably read "less than 1000 G" instead of "at least 1000 G".

*Osafune* '302 also teaches to rotate the wet gel tube to prevent collapsing by gravity of the fresh tubular wet gel when it is still soft. The teaching advises that a very slow rotation is necessary on the order of 0.1 rpm. See, col. 7, lines 62-68 and col. 8, lines 1-14.

Applicants have pointed out the problem of syneresis. This is a phenomenon which can take place during the gelling phase. A gel in formation decreases its volume of about 1-3%

compared to the volume of the sol with an isotropic contraction towards its center with an isotropic contraction towards its center. If the gel contains inside it an incompressible body such as a dense core of a perform, contraction is prevented in the radial direction but occurs tangentially giving rise to intense lateral traction forces which leads to the destruction of the gel. Neither of the *Osafune* patents have faced the syneresis problem because they have no glassy core at the center of the gel. Hence, they do not teach to use rotation for improving the original gel but only how to rotate safely without damaging it. More particularly, neither of the *Osafune* patents teach the definition of the rotation which is now incorporated into Claim 1 of the present application. Consequently, applicants respectfully submit that even if the teachings of *Masumi* were modified to include one or both of the *Osafune* features, it would still not arrive at the presently claimed invention. Accordingly, applicants respectfully submit that the combination of references relied on by the Examiner does not create *prima facie* obviousness and, therefore, the rejection based on that combination of references should be withdrawn.

The rejection of Claims 9-12 under 35 U.S.C. § 102(b) as anticipated by or rendered obvious by *Oku* (US 5,352,259), *Chandross* (US 5,240,488) is rendered moot since these claims no longer appear in the case.

With regard to the copending application No. 10/241,813, appropriate action will be taken within the next month depending upon whether the drawings are accepted in this application by transfer from the international application.


App. No. 09/914,917  
Amend. Dated Feb. 18, 2004  
Resp. to Office Action of Nov. 12, 2003

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Accordingly, it is respectfully requested that the rejection on the ground of double patenting be deferred at the present time.

Respectfully submitted,

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